

QUADRANT II – TRANSCRIPT AND RELATED MATERIALS (NOTES)

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Unit 07: Nervous System

Module Name: Cranial nerves in mammals

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Notes

Cranial nerves arise from the brain as twelve pairs. They are numbered I to XII in order. Cranial Nerve I and II arise from the cerebral hemispheres whereas Cranial Nerve III- XII arise from the brain stem (midbrain, pons and medulla). The cranial nerves may be sensory, motor or both.

Cranial Nerve I- Olfactory nerve: The olfactory nerve communicates chemical airborne signals to the brain. The olfactory nerve (I) arises from the undersurface of the frontal lobe and its connections pass to the temporal lobe.

Cranial Nerve II- Optic nerve: The optic nerve communicates optic information. Variations in contrast are important stimulations of the visual system. This is an outgrowth of the diencephalon. This cranial nerve is attached to the wall and floor of the third ventricle.

Cranial Nerve III- Oculomotor nerve: The oculomotor controls all of the extraocular eye muscles (except trochlearis and lateral rectus muscles). It innervates the superior, inferior, medial rectus, and inferior oblique muscles. It also controls the size of the pupil and stretches the lens to achieve accommodation. Cranial Nerve III also innervates the eyelid, making it possible to close the eye when lying down. It also controls the size of the pupil and stretches the lens to achieve accommodation.

Cranial Nerve IV- Trochlear nerve: The cranial nerve IV originates in the midbrain and innervates the superior oblique muscle that controls the up and down movement of the eye. It is the smallest cranial nerve but has the longest intracranial course. It is also the only cranial nerve to arise from the dorsal aspect of the brain stem.

Cranial Nerve V- Trigeminal nerve: Cranial Nerve V Innervates the skin of the face and the cornea. It communicates sensory information about touch and pain from the face and the mouth. It is also the nerve that causes toothache and the severe pain of trigeminal neuralgia. Lesions to the sensory portion of Cranial Nerve V cause a loss of sensation of the face. Loss of corneal sensation could result in corneal bruises. This cranial nerve also controls the muscles of mastication.

Cranial Nerve VI- Abducens nerve: This nerve controls eye movements from the midline toward the side. Lesion to this nerve prevents movements of the eye from the midline and outward.

Cranial Nerve VII- Facial nerve: This nerve controls the facial muscles. The autonomic fibres of Cranial Nerve VII control the tear glands and salivary glands. Loss of facial function makes it difficult to eat. Lack of tears and the inability to close the eye result in injuries to the cornea.

Cranial Nerve VIII- Vestibulocochlear nerve: This nerve communicates auditory information and information about head movements.

Cranial Nerve IX- glossopharyngeal nerve: This nerve originates in the medulla oblongata and exits the skull via the jugular foramen. It innervates the stylopharyngeus muscle to elevate the pharynx and larynx. This cranial nerve also receives signals from proprioceptors in swallowing muscles, baroreceptors and chemoreceptors in the carotid body. It provides sensory function to the oropharynx and innervates the parotid gland to secrete saliva.

Cranial Nerve X- Vagus nerve: This nerve originates in the medulla oblongata and exits the skull via the jugular foramen. It innervates muscles of the pharynx, larynx, and soft palate for vocalization and swallowing. This nerve receives signals from the external ear, taste buds in the epiglottis and pharynx, and proprioceptors in the throat and neck. The vagus nerve controls heart rate, breathing, sweating and movements of the gut.

Cranial Nerve XI- Spinal accessory nerve: The Cranial Nerve XI arises from the first five segments of the cervical portion of the spinal cord. It innervates the muscle in the neck and the trapezius muscle in the shoulder to control head movements. It controls muscles in the neck and shoulder.

Cranial Nerve XII- Hypoglossal nerve: The Cranial Nerve XII is responsible for the movement of the tongue. Of the eight muscles, only the palatoglossus is not controlled by the hypoglossal nerve. It innervates the tongue's extrinsic and intrinsic muscles. In the case of unilateral lesions, there is a deviation of the tongue and atrophy of the tongue on the affected side. In bilateral lesions, it is impossible to speak and swallowing is impaired.
